

REMARKS

Claims 7-15 and 21-29 were pending at the time of the outstanding office action. By way of the instant amendment, claims 8 and 10 have been cancelled. Thus, claims 7, 9, 11-15 and 21-29 remain for examination.

Claims 7-15 and 21-29 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Nagasaka, U.S. Patent No. 5,511,156.

The examiner's rejection of claims 7-15 and 21-29 is respectfully traversed.

Independent claims 7, 13, 21, 22, 23, and 24 have been amended. As amended, these claims recite, among other features, that print data is divided into a plurality of print data bands, and that the print data bands are transferred sequentially to available ones of said print data expanders. The bands recited in these claims are obtained by dividing a page of print data into bands of data in the printing direction (from the top of a page to the bottom). After a band has been transferred to a print data expander, the subsequent band is selected and transferred to another available expander. Thus, print data expanding is performed in parallel from the top of a page to the bottom or in the printing direction. The "sequential" language objected to by the examiner under 35 U.S.C. § 112, paragraph 1, has been removed in order to expedite further prosecution of the application.

Claims 7, 13, and 21-24 further recite that expanded bit-map band data is combined after being transferred to the print server computer. In a distributed system, because there may be differences in processing speeds among the client computers and the print server computer, the print server computer does not always receive the expanded bit-map band data in the original sequence. Therefore, the print server computer stores the received bit-map band data and rearranges the bit-map band data to put it in the original sequence. It is an advantage of the present invention that, because the bands are expanded in parallel by the client computers and the print server computer, there is a very good likelihood that the bands are expanded in the original sequence. This results in an extremely simplified rearranging operation (see e.g. step S407 of Fig. 4). Thus, a high speed printing operation is performed and a reduced amount of buffer memory is required.

In Nagasaka, on the other hand, the intermediate code file is divided into a plurality of partial files. In Fig. 27, for example, a printable area is divided into a plurality of oblong areas. However, Nagasaka teaches group discrimination in connection with the division of the printable area into oblong areas. Accordingly, an overlap between two graphic form elements is detected to determine whether these elements are part of the same graphic form group. [Nagasaka, col. 22, ln. 40 through col. 23, ln. 42] Nagasaka does not teach how the divided oblong areas are expanded in the system to obtain a high printing speed. Because of the group discrimination, however, there is a low probability that the divided oblong areas are expanded in the original sequence. Accordingly, the system and method disclosed in Nagasaka may result in a significant rearranging operation and, therefore, a low-speed printing operation and a need for more buffer memory.

In addition, claims 7, 13, and 21-24 further have been amended to recite that the plurality of bands are transferred to available print data expanders without grouping the bands prior to transfer. Applicant believes that this feature further distinguishes the claims from Nagasaka. As discussed above, Nagasaka teaches group discrimination. As shown in Nagasaka's Figure 27, although Nagasaka divides the print data into a plurality of oblong areas, Nagasaka groups the oblong areas according to detected graphic form groups before transferring the oblong areas to processors for processing. Applicant discloses dividing the print data into bands and sequentially transferring the bands, without consideration of graphic form groups. Thus, claims 7, 13, and 21-24 have been amended to explicitly recite that the bands are transferred without grouping prior to transfer. For this additional reason, applicant believes that claims 7, 13, and 21-24 recite features that are neither disclosed nor suggested in Nagasaka.

Applicant's independent claims have also have been further amended to additionally clarify from the prior art. In particular, claim 7, for example, has been amended to recite that the available ones of the print data expanders of the print server computer and the plurality of client computers are determined by checking a print data expanding process status received from each of the print server computer and the plurality of client computers without first sending a message to request participation to

said print server computer and said plurality of client computers. Similar limitations have been placed in all of applicant's independent claims. In contrast, Nagasaka teaches that the client process 210 transmits a message to request participation to the distributed processing to the other computer 6b and 6c via the network. In response to the message to request the participation to the distributed processing, the resident program is actuated to check the current processor load of the computer 6a or 6b and transmits an answer indicative of the participatability to the distributed processing. See, for example, column 7, line 60 through column 8, line 8. As indicated by applicant's amended language, applicant's invention does not utilize a prior message which must be sent to determine whether the print data expanders want to participate in the distributed processing. Applicant's print data expanders automatically send flags which are set or reset depending upon the availability of the data expanders. As such, applicant's claims further differentiate from the applied prior art.

Applicant's dependent claims depend direction or indirectly upon applicant's independent claims and are thus deemed to be patentable at least for the same reasons indicated above with regard to applicant's independent claims.

The application is now considered to be in condition for allowance and an early indication of same is earnestly solicited.

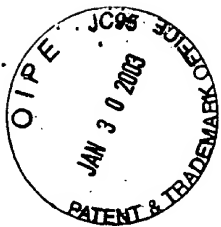
Respectfully submitted,

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By 

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Atty. Dkt. No. 043034-0135

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Masaki WATANABE

Title: PRINT DATA CONTROL SYSTEM
USING DISTRIBUTED
PROCESSING OF PRINT DATA
(Amended)

Appl. No.: 09/174,551

Filing Date: 10/19/98

Examiner: K. Poon

Art Unit: 2624

**MARKED-UP COPY OF AMENDMENT AND REQUEST FOR RECONSIDERATION
UNDER 37 C.F.R. § 1.111**

Commissioner for Patents
Box Non-Fee Amendment
Washington, D.C. 20231

Sir:

This communication is in response to the office action dated October 24, 2002, concerning the above referenced patent application.

Please amend the application as follows:

IN THE TITLE:

On page 1, please delete the title and insert a new title as follows:

Print Data Control System Using Distributed Processing of Print Data.

IN THE CLAIMS:

Please cancel claims 8 and 10.

7. (Amended) A network system composed of a print server computer and a plurality of client computers, wherein ~~each of the print server computers and the plurality of client computers has~~ the print server computer and the plurality of client

computers each have a print data expander for expanding print data to bit-map band data in parallel, wherein

each of the plurality of client computers comprises:

a page divider for dividing generated print data for each page into a plurality of bands, wherein the generated print data is generated by an application; and

a transfer controller for transferring a sequentially selected one of the bands to a ~~sequentially available one~~ones of print data expanders of the print server computer and ~~either the plurality of~~ client computers, said transfer being performed without grouping said bands prior to transfer, wherein expanded bit-map band data by the print data expander of each client computer is transferred to the print server computer,

said available ones of the print data expanders of the print server computer and the plurality of client computers determined by checking a print data expanding process status received from each of the print server computer and the plurality of client computers without first sending a message to request participation to said print server computer and said plurality of client computers; and

the print server computer comprises:

a combiner for combining bit-map band data expanded by the print data expander of the print server computer and the expanded bit-map band data received from at least one of the client computers to produce combined bit-map band data corresponding to the generated print data.

13. (Amended) A print data control method for a network system composed of a print server computer and a plurality of client computers, comprising the steps of:

at each of the plurality of client computers;

a) dividing print data into a plurality of sequential bands;

b) distributing the sequential bands, without grouping the bands prior to transmission, sequentially over the print server computer and at least one of the client computers, to expand the sequential bands to bit-map band data in parallel among the print server computer and said at least one client computer; said distributing step including selecting an available one of the print server computer and the client computer by checking print data expanding process statuses thereof; without first sending a message to request participation to said print server computer and the client computer; and

at the print server computer,

c) combining the bit-map band data expanded by the print server computer and said at least one client computer to produce combined bit-map band data corresponding to the print data.

14. (Amended) The print data control method according to claim 13, wherein the step b) comprises the steps of:

at the client computer,

selecting one from the sequential bands in sequence;

~~selecting an available one of the print server computer and the client computer by checking print data expanding process statuses thereof;~~

transferring a selected band to a selected available computer;

expanding a client-received band to bit-map band data; and

setting a print data expanding client process status to unavailable while expanding the client-received band and resetting the print data expanding client process status to available when a print data expanding process of the client-received band has been completed, and

at the print server computer,

expanding a server-received band to bit-map band data; and

setting a print data expanding server process status to unavailable while expanding the client-received band and resetting the print data expanding server process status to available when a print data expanding process of the client-received band has been completed.

21. (Amended) A network system comprising a print server computer and a plurality of client computers, wherein each of the plurality of client computers comprises:

a first print data expander for expanding print data to bit-map band data;

a page divider for dividing generated print data for each page into a plurality of bands, wherein the generated print data is generated by an application; and

a transfer controller for transferring a sequentially selected one of the bands to a sequentially available ~~one~~ones of print data expanders of the print server computer and ~~other~~ client computers, said transfer being performed without grouping said bands prior

to transfer, wherein expanded bit-map band data by the print data expander of each client computer is transferred to the print server computer,

said available ones of the print data expanders of the print server computer and the plurality of client computers determined by checking a print data expanding process status received from each of the print server computer and the plurality of client computers without first sending a message to request participation to said print server computer and said plurality of client computers; and

the print server computer comprising:

a second print data expander for expanding print data received from at least one of the client computers to bit-map band data in parallel with said first print data expander;

a combiner for combining bit-map band data expanded by the print data expander of the print server computer and the expanded bit-map band data received from at least one of the client computers to produce combined bit-map band data corresponding to the generated print data.

22. (Amended) A client computer in a network system comprising a print server computer and a plurality of client computers, said client computer comprising:

a print data expander for expanding print data to bit-map band data;

a page divider for dividing generated print data for each page into a plurality of bands, wherein the generated print data is generated by an application; and

a transfer controller for transferring a sequentially selected one of the bands to a sequentially available one of print data expanders of the print server computer and other client computers, said transfer being performed without grouping said bands prior to transfer, wherein expanded bit-map band data by the print data expander of the client computer is transferred to the print server computer,

said available ones of the print data expanders of the print server computer and the plurality of client computers determined by checking a print data expanding process status received from each of the print server computer and the plurality of client computers without first sending a message to request participation to said print server computer and said plurality of client computers; and

wherein the print server computer combines bit-map band data expanded by the printer server computer and the expanded bit-map band data received from at least one

of the client computers to produce combined bit-map band data corresponding to the generated print data.

23. (Amended) A network system comprising a plurality of client computers and a server program for instructing a print server computer, wherein each of the plurality of client computers comprises:

a first print data expander for expanding print data to bit-map band data;

a page divider for dividing generated print data for each page into a plurality of bands, wherein the generated print data is generated by an application; and

a transfer controller for transferring a sequentially selected one of the bands to a sequentially available one of print data expanders of the print server computer and other client computers, said transfer being performed without grouping said bands prior to transfer, wherein expanded bit-map band data by the print data expander of each client computer is transferred to the print server computer, and

said available ones of the print data expanders of the print server computer and the plurality of client computers determined by checking a print data expanding process status received from each of the print server computer and the plurality of client computers without first sending a message to request participation to said print server computer and said plurality of client computers; and

the server program comprises the steps of:

expanding print data received from at least one of the client computers to bit-map band data in parallel with said first print data expander;

combining bit-map band data expanded by the print data expander of the print server computer and the expanded bit-map band data received from at least one of the client computers to produce combined bit-map band data corresponding to the generated print data.

24. (Amended) A network system comprising a print server computer, a plurality of client computers and a client program for instructing a client computer, said program comprising the steps of:

expanding print data to bit-map band data;

dividing generated print data for each page into a plurality of bands, wherein the generated print data is generated by an application; and

transferring a sequentially selected one of the bands to ~~a sequentially available~~
~~one~~ones of print data expanders of the print server computer and ~~other~~ client
computers, wherein expanded bit-map band data by the print data expander of each
client computer is transferred to the print server computer;

said available ones of the print data expanders of the print server computer and
the plurality of client computers determined by checking a print data expanding process
status received from each of the print server computer and the plurality of client
computers without first sending a message to request participation to said print server
computer and said plurality of client computers.